

**Notice of Allowability**

Application No.

10/014,415

Examiner

Ted Kim

Applicant(s)

MOWILL, R. JAN

Art Unit

3746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 09/21/2004.
2. ☒ The allowed claim(s) is/are 1-5,7-9,11-22,24-27 and 34.
3. ☐ The drawings filed on \_\_\_\_\_ are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
  1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☒ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☒ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |   |  |
|---|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892)  | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                | 6. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),<br>Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment                    |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material          | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance   |
|   | 9. <input type="checkbox"/> Other _____.   |

### EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Bruce Zotter on 11/16/04.

The application has been amended as follows:

#### Specification

- The first paragraph of the specification has been replaced by the following:

--This application is a Continuation-In-part of Application Serial No. 09/500,960 filed February 15, 2000, now abandoned. This application claims priority from Application Serial No. 09/500,960, filed February 15, 2000, , now abandoned, Application Serial No. 09/258,812, filed February 26, 1999, now abandoned, and Provisional Application No. 60/168,681, filed December 3, 1999.—

- On page 11, last paragraph, 1<sup>st</sup> line, "Fig. 5" has been replaced by --Fig. 5A—
- On page 11, a new last paragraph has been inserted,

--Fig. 5B is a schematic cross-section of the premixer assembly of Fig. 5A taken along line 5B-5B--.

## Claims

The claims have been amended below.

Previously non-elected claims 2, 7, 15-19 have been reinstated due to the allowable generic claims.

1. (Amended) Apparatus for premixing fuel and air to provide a fuel/air mixture, the apparatus comprising:

a fuel valve for controlling a flow of fuel;

an air valve for controlling a flow of air in accordance with the flow of fuel to provide a controlled fuel/air ratio;

a mixing tube configured for receiving and mixing the fuel and air, the mixing tube having an entrance, an axis, and an exit for discharging a fuel/air mixture; and

a mixture valve associated with said mixing tube exit and separate from the fuel valve and the air valve, the mixture valve including inner and outer mixture valve members that together define an asymmetric exit flow area;

wherein the defined exit flow area includes at least two segmented, substantially opposed, mixture flow-directing area portions with respect to an angular position about the mixing tube axis;

wherein said mixture valve is configured to asymmetrically flow said fuel/air mixture predominantly through said mixture flow directing area portions; and

wherein at least one of said inner and outer mixture valve members is movable relative to the other of said valve members to selectively vary the defined exit flow area with respect to time.

11. (Amended): Apparatus for combusting fuel and air comprising:

an annular combustion chamber having an axis;

at least one premixer configured to receive fuel and air;

wherein said premixer has a venturi for mixing the received fuel and air to form a fuel/air mixture and an exit in fluid communication with the combustion chamber for discharging the fuel/air mixture, the venturi having an axis;

wherein the premixer exit further includes inner and outer members defining an asymmetric exit flow area, said exit flow area including area portions configured for channeling the fuel/air mixture in substantially opposed tangential directions relative to the chamber axis;

wherein said inner member is configured to asymmetrically flow said fuel/air mixture predominantly through said fuel/air mixture channeling area portions;

wherein at least one of said inner and outer members is movable along said venturi axis relative to the other to selectively vary said defined exit flow area with respect to time, whereby a mixture discharge velocity can be varied;

wherein said premixer includes a compressed air flow path between a compressed air source and said venturi, and a fuel flow path between a fuel source and said venturi;

wherein the combustion apparatus further includes an air valve and a fuel valve disposed in the respective fuel and air flow paths for controlling the fuel/air ratio of said fuel/air mixture; and

wherein relative movement between said inner and outer members varies the velocity of the controlled fuel/air ratio discharged mixture.

13. (Amended): Apparatus for combusting fuel with air, the apparatus comprising:

an annular combustion chamber having an axis;

(1) means for controlling a flow of the fuel;

(2) means for controlling a flow of the air in accordance with the flow of fuel to provide a controlled fuel/air ratio;

at least one premixer configured to receive the fuel and air, the premixer further including

(3) means for mixing the received fuel and air to form a fuel/air mixture,

(4) exit means in fluid communication with the combustion chamber for distributing the fuel/air mixture to the combustion chamber; and

wherein said exit means further includes:

(i) means for defining an asymmetric exit flow area, said exit flow

area including area portions for asymmetrically channeling fuel/air mixture

flow predominantly in substantially opposed tangential directions relative to

the combustion chamber axis, and

(ii) means separate from the fuel flow controlling means and the air flow controlling means, for selectively varying the defined exit flow area with respect to time.

15. (Amended): Apparatus for premixing fuel and air to provide a fuel/air mixture, the apparatus comprising:

a mixing tube configured for receiving and mixing the fuel and air, the mixing tube having an entrance, an axis, and an exit for discharging the fuel/air mixture;

a mixture valve associated with said mixing tube exit;

wherein said mixture valve includes coaxial inner and outer valve members having respective ends that define an asymmetric exit flow area;

wherein at least the outer valve member end is contoured such that the defined exit flow area includes two opposed exit area portions with respect to an angular position about the mixing tube axis and through which the fuel/air mixture predominantly flows and exits asymmetrically; and

wherein at least said inner valve member is movable relative to the outer valve member to selectively vary the exit flow area with respect to time.

17. (Amended): Apparatus for combusting fuel and air comprising:

an annular combustion chamber having an axis;

at least one premixer configured to receive fuel and air;

wherein said premixer has a venturi for mixing the received fuel and air to form a fuel/air mixture, the venturi having an axis;

wherein the premixer has an exit in fluid communication with the combustion chamber for discharging the fuel/air mixture;

wherein the premixer exit includes inner and outer members defining an asymmetric exit flow area;

wherein at least said outer valve member is configured to define exit flow area portions asymmetrically positioned for directing the fuel/air mixture predominantly in substantially opposed tangential directions relative to the chamber axis, and

wherein at least said inner member is movable relative to the outer member to selectively vary said defined exit flow area with respect to time, whereby a mixture discharge velocity can be varied.

20. (Amended): A method for controlling the velocity and direction of a fuel/air mixture discharged from a premixer apparatus, the apparatus having a fuel/air mixing tube flow-connected to respective sources of fuel and compressed air, the mixing tube having an axis, an inlet, and an exit for discharging the fuel/air mixture, the method comprising:

controlling the rate of flow of fuel and rate of air flow into the mixing tube inlet to provide a controlled fuel/air ratio;

providing a mixture valve associated with the exit including inner and outer valve members together defining an asymmetric exit flow area;

asymmetrically channeling the discharged fuel/air mixture predominantly in at least two opposed directions relative to an angular position about the axis using the mixture valve; and

moving at least one of the inner and outer valve members relative to the other to increase or decrease the exit flow area, whereby the channeled fuel/air mixture velocity is respectively decreased or increased.

24. (Amended): A gas turbine gas generator operable with a fuel source, the gas generator comprising:

an air compressor;  
a turbine;  
a shaft assembly interconnecting the air compressor and the turbine;  
and a combustor operatively connected to provide combustion gases to the turbine;

wherein the engine further includes one or more premixers each having

- (1) a mixing tube configured for receiving and mixing the fuel and air, the mixing tube having an axis and an exit for discharging a fuel/air mixture to the combustor; and
- (2) a mixture valve associated with said mixing tube exit and including inner and outer valve members that define an asymmetric exit flow area;



wherein the defined exit flow area includes at least two segmented, substantially opposed area portions with respect to an angular position about the mixing tube axis;

wherein said inner mixture valve member is configured to asymmetrically flow said fuel/air mixture predominantly through said at least two opposed area portions;

wherein the segmented area portions include ports for directing the discharged fuel/air mixture relative to the mixing tube axis;

wherein at least one of said inner and outer valve members is movable relative to the other of said valve members to selectively vary the defined exit flow area with respect to time;

wherein the gas turbine gas generator further includes a compressed air path interconnecting the compressor and each mixing tube; a fuel path interconnecting the source of fuel and each mixing tube; an air valve positioned in the compressed air path, and a fuel valve positioned in the fuel path; and

wherein the air valve and fuel valve are separate from said mixture valve and are operable to control a fuel/air ratio of the mixture discharged from said mixing tube through said mixture valve.

## Drawings

2. The following changes to the drawings have been approved by the examiner and agreed upon by applicant: on Figure 16 at the inlet of the premixer “1446” should be – 1440 –. In order to avoid abandonment of the application, applicant must make these above agreed upon drawing changes.

3. New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because the proposed drawing changes on 9/21/04 and 6/17/03 and 2/18/04 have been approved. Formal drawings are required. Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

#### **REASONS FOR ALLOWANCE**

4. The following is an examiner's statement of reasons for allowance: applicant's arguments are persuasive and binding in view of the claims as amended above. It is noted that without amendment, since there are at least two segmented flow directing portions claimed, a number could be selected, e.g. four, which create a symmetric flow exit and still read on the claim. Such a configuration is the type shown in the prior art. Consequently, the above amendments serve to distinguish the claims over the art of record.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

*Contact Information*

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Ted Kim whose telephone number is 703-308-2631 until approximately November 22 at which point the telephone number will be 571-272-4829. The Examiner can be reached on regular business hours before 5:00 pm, Monday to Thursday and every other Friday.

The fax numbers for the organization where this application is assigned are 703-872-9306 for Regular faxes and 703-872-9306 for After Final faxes.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl Tyler, can be reached on 703-306-2772.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist of Technology Center 3700, whose telephone number is 703-308-0861. General inquiries can also be directed to the Patents Assistance Center whose telephone number is 800-786-9199. Furthermore, a variety of online resources are available at <http://www.uspto.gov/main/patents.htm>



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